

CLAIMS

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is as follows:

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- 1 1. A method of depositing a film containing
2 silicon on a crystalline silicon surface, said
3 method including steps of
4 introducing a gas containing precursor material
5 into a reaction vessel,
6 adsorbing an activated species formed from said
7 precursor material on said crystalline silicon
8 surface, and
9 determining a partial pressure of hydrogen in
10 residual gases as said activated species is
11 deposited on said crystalline silicon surface.
- 1 2. A method as recited in claim 1, including the
2 further step of
3 controlling at least one of temperature and
4 mass flow of said precursor material in said reactor
5 vessel in response to said partial pressure of
6 hydrogen.
- 1 3. A method as recited in claim 2 including the
2 further steps of
3 monitoring total residual gas pressure in said
4 reactor vessel, and
5 evaluating changes in said partial pressure of
6 hydrogen based on said total pressure.

- 1 4. A method as recited in claim 1 wherein said
2 film is epitaxial silicon.
- 1 5. A method as recited in claim 1 wherein said
2 film is an alloy of silicon and germanium.
- 1 6. A method as recited in claim 1, including the
2 further steps of
3 repetitively sampling said residual gases, and
4 converting said partial pressure of hydrogen
5 corresponding to respective samples to a property of
6 said film.
- 1 7. A method as recited in claim 6, wherein said
2 property of said film is a film thickness.
- 1 8. A method as recited in claim 6, wherein said
2 property of said film is a concentration of a
3 material.
- 1 9. A method as recited in claim 6, wherein said
2 film is an alloy of silicon and germanium and said
3 property is a germanium concentration profile.
- 1 10. A method as recited in claim 1, wherein said
2 film includes a film of silicon and a film of an
3 alloy of silicon and germanium.

1 11. Apparatus for depositing a film containing
 2 silicon on a crystalline silicon surface including
 3 means for introducing a gas containing
 4 precursor material into a reaction vessel such that
 5 an activated species formed from said precursor
 6 material is adsorbed on said crystalline silicon
 7 surface, and
 8 means for determining a partial pressure of
 9 hydrogen in residual gases as said activated species
 10 is deposited on said crystalline silicon surface.

1 12. Apparatus as recited in claim 11, further
 2 including
 3 means for controlling at least one of
 4 temperature and mass flow of said precursor material
 5 in said reactor vessel in response to said partial
 6 pressure of hydrogen.

1 13. Apparatus as recited in claim 12, further
 2 including
 3 means for monitoring total residual gas
 4 pressure in said reactor vessel, and
 5 means for evaluating changes in said partial
 6 pressure of hydrogen based on said total pressure.

1 14. Apparatus as recited in claim 11 wherein said
 2 film is epitaxial silicon.

1 15. Apparatus as recited in claim 11 wherein said
 2 film is an alloy of silicon and germanium.

1 16. Apparatus as recited in claim 11 further
2 including
3 means for repetitively sampling said residual
4 gases, and
5 means for converting said partial pressure of
6 hydrogen corresponding to respective samples to a
7 property of said film.

1 17. Apparatus as recited in claim 16, wherein said
2 property of said film is a film thickness.

1 18. Apparatus as recited in claim 16, wherein said
2 property of said film is a concentration of a
3 material.

1 19. Apparatus as recited in claim 16, wherein said
2 film is an alloy of silicon and germanium and said
3 property is a germanium concentration profile.

1 20. Apparatus as recited in claim 11, wherein said
2 film includes a film of silicon and a film of an
3 alloy of silicon and germanium.